IN THE CLAIMS

1 *(previously presented):* A rocket plume detector comprising:

a) a passive electro-optical sensor for detecting narrow band spectral emissions in a rocket engine plume, including through clouds and

b) a lock-in amplifier to reduce background radiation for enhanced plume detection, said sensor being mounted on an above-flying or orbiting platform.

2 *(previously presented):* The detector of claim 1 wherein said sensor isolates the rocket plume wavelength of interest selected from the group of aluminum, aluminum perchlorate, carbon dioxide, carbon monoxide, copper, copper hydride, hydrogen chloride, hydroxyl, methane, mon-methyl hydrazine, nitric acid, nitric oxide, nitrogen dioxide, nitrous oxide, polybutadiene, potassium, sodium, sulfur dioxide, and water to detect a rocket launch plume.

3 *(previously presented):* The plume detector of claim 1 wherein said platform is an aircraft or an orbiting satellite.

4 *(previously presented):* The detector of claim 3 which includes a narrow band filtered radiometer when carried on said aircraft or includes a spectrographic imager when carried on said satellite or vice versa.

5 *(previously presented):* The plume detector of claim 2 wherein said sensor can spectrally isolate or detect the emission wavelength of interest in the plume of a rocket being launched through fog, clouds and other water vapor.

6 *(previously presented):* The plume detector of claim 5 wherein said sensor can spectrally detect the emission wavelength of Na or K in a rocket engine plume.

7 (previously presented): The detector of claim 1 wherein said sensor has

a) a narrow band filtered photometer,

b) data acquisition electronics and

c) a computer to monitor & record resulting data.

8 *(previously presented):* The plume detector of claim 1 comprising

a) collection optics for plume emissions,

b) a focal plane assembly which includes a spectral filter,

c) data acquisition avionics,

d) a global positioning system (GPS) receiver and

e) a computer for receiving the detector data signal and the GPS data for data acquisition, storage, processing and display.

9 *(previously presented):* The plume detector of claim 8 wherein said focal plane assembly includes a photomultiplier and said spectral filter serves to pass the emission of interest and to reject the background emission.

10 *(previously presented):* The plume detector of claim 8 wherein said GPS receiver records the flight path of the detector platform.

11 *(previously presented):* The plume detector of claim 8 wherein a 10-nm-wide or spectral filter suitable for nighttime emission detection is replaced with a 0.005 nm atomic line filter (ALF) for daytime emission detection.

12 *(previously presented):* The plume detector of claim 3 employing ultraviolet and visible imagers and spectrographic imagers as a UVISI sensor on-board said satellite platform, to measure from space, a ground-based Na emission source or to measure from space, the emission of interest in the plume of a rocket being launched.

13 *(previously presented):* The plume detector of claim 3 employing a sensor with a narrow band spectral filter at a wavelength that is radiated through clouds.

14 *(previously presented):* The plume detector of claim 3 adapted to employ a plurality of filters, radiometric or spectrometric, which detector is tunable to a desired rocket plume emission wavelength.

15 *(previously presented):* The rocket plume detector of claim 14 being suited for both missile detection and characterization.

16 *(previously presented):* A method of detecting a rocket plume comprising:

a) employing a passive electro-optical sensor for detecting narrow band spectral emissions in a rocket engine plume, including through clouds and

b) employing a lock-in amplifier to reduce background radiation for enhanced plume detection, said sensor being mounted on an above-flying or orbiting platform.

!7 *(new):* The method of claim 16 wherein said sensor isolates the rocket plume wavelength of interest selected from the group of aluminum, aluminum perchlorate, carbon dioxide, carbon monoxide, copper, copper hydride, hydrogen chloride, hydroxyl, methane, mon-methyl hydrazine, nitric acid, nitric oxide, nitrogen dioxide, nitrous oxide,

polybutadiene, potassium, sodium, sulfur dioxide, and water to detect a rocket launch plume.

18 *(new):* The method of claim 16 wherein said platform is an aircraft or an orbiting satellite.

19 *(new):* The method of claim 16 wherein said sensor can spectrally isolate or detect the emission wavelength of interest in the plume of a rocket being launched through fog, clouds and other water vapor.

20 *(new):* The method of claim 19 wherein said sensor can spectrally detect the emission wavelength of Na or K in a rocket engine plume.

21 *(new):* The method of claim 18 employing a sensor with a narrow band spectral filter at a wavelength that is radiated through clouds.